

# Hydrogen Storage at



## Lawrence Berkeley National Laboratory

### Presentation at the Hydrogen Storage Grand Challenge Pre-Solicitation Meeting

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# Topics



- **Related electrochemistry research for batteries and fuel cells**
- **Metal hydrides**
- **Nanostructured materials**

# Electrochemistry



- Strong expertise and extensive experience in electrochemical systems supported by SC, EERE, and FE
- Lithium batteries for pure- and hybrid-electric vehicles: materials, diagnostics, test cells, modeling
- PEM fuel cells: Phil Ross (electrocatalysts), John Newman (modeling), Elton Cairns (systems)
- Solid oxide fuel cells: Lutgard DeJonghe, Steve Visco
- Apply research tools and electrochemical system expertise to hydrogen storage, fuel cells, and system integration issues
  - Novel membranes and other materials
  - Advanced diagnostic characterization
  - Modeling

# Metal Hydrides



- Research on thin-film metal hydrides for control of window optical properties (Tom Richardson)
  - Presence/absence of hydrogen switches window from transparent to reflective
- Fundamental understanding of the complex solid state chemistry of hydrogen absorption and desorption by metals and alloys
- Experience in preparing and studying hydrogen storage materials and processes in thin films
- *In situ* spectroscopic, microscopic, and diffraction techniques
- Ability to prepare bulk samples if needed

- As for all the Labs, LBNL is increasing its efforts in nano-science and nano-technology
- Spin-off companies are working to commercialize particular technologies
- Work on nanotubes by Marvin Cohen and Alex Zettl has led to the company “Nanomix” with targets of
  - Sensors
  - Hydrogen storage
- Storage based on low temperature adsorption on material in insulated storage container
  - Promising results
  - Interested in working with LBNL on further development